

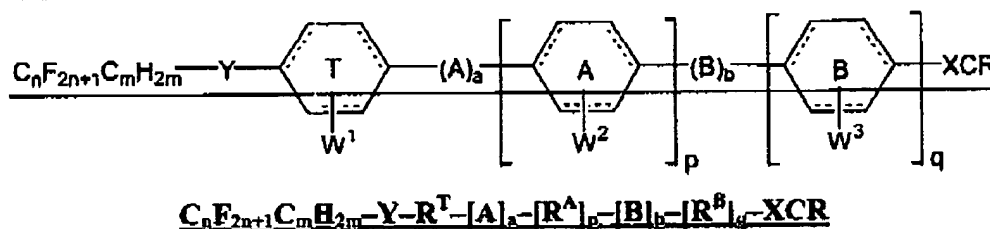
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Amendment Response to OA of 07/29/05

AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A chiral, non-racemic liquid crystal composition ~~which comprises an achiral liquid crystal host and up to about 100% by weight of one or more comprising a chiral, non-racemic compounds having~~ compound of the formula:



wherein

n is an integer from 1 to 20; and

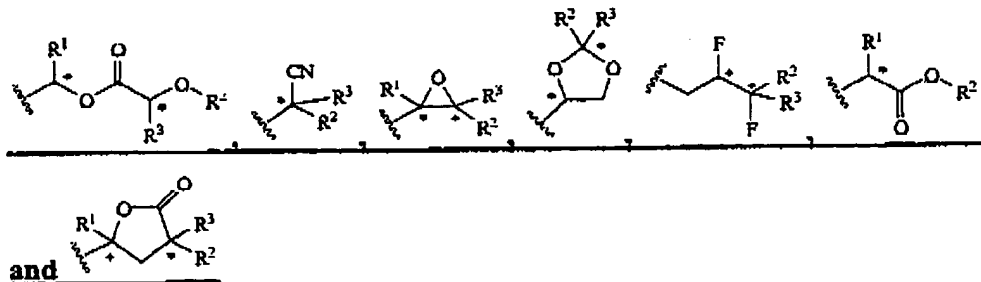
m is an integer from 2 to 20;

a, b, p and q are either 0 or 1, when p is 0, a is 0 and when q is 0, b is 0;

Y is a single bond or an oxygen;

X is selected from the group consisting of a single bond, oxygen, -CO-, -O-CO-, -CO-O- and a lower ~~alkyl~~ alkylene group where one or more carbon atoms is optionally substituted with one or more of oxygen or -CO-;

CR is a chiral, non-racemic tail group moiety except that CR cannot be a chiral hydrocarbon tail selected from the group consisting of:



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wherein

each of R¹ and R³ is independently hydrogen, lower alkyl, lower alkenyl, lower haloalkyl, or lower haloalkenyl;

R² is an alkyl, alkenyl, ether, thioether, or silyl group having from 1 to about 20 carbon atoms wherein one or more CH₂ groups are optionally replaced with -S-, -O-, -CO-, -CO-O-, -O-CO-, or -Si(R')₂, and where R' is lower alkyl or lower haloalkyl, provided at least one carbon center indicated by * is an asymmetric carbon center;

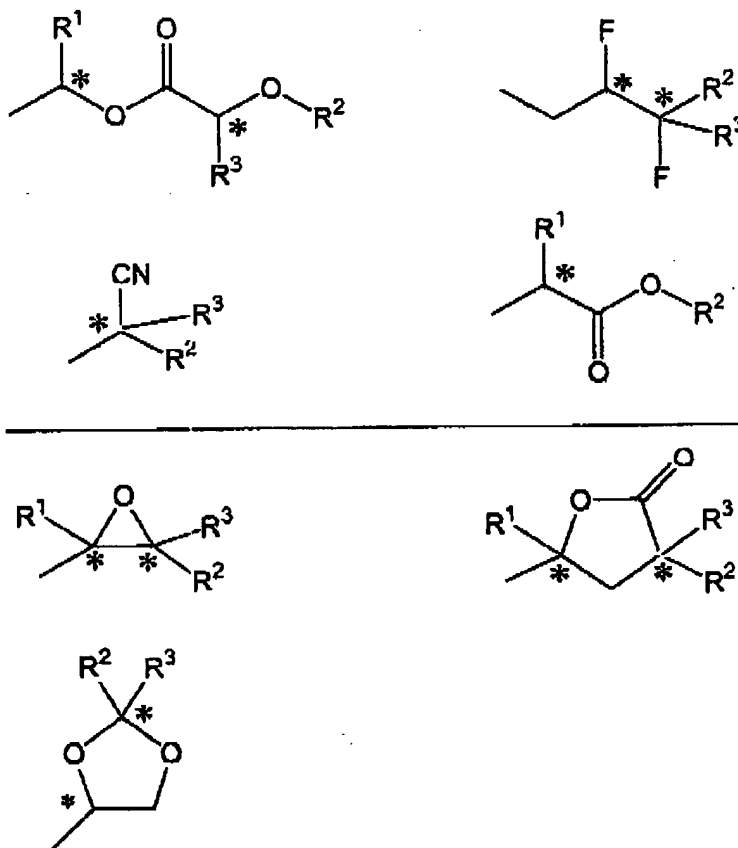
A and B, independently, are linker groups ~~that can be~~ selected from the group consisting of -CO-, -O-CO-, -CO-O-, -CH₂-CH₂-, -CH₂-CH₂-O-, -O-CH₂-CH₂-, -C≡C-, ~~-C=C-~~, ~~-CH=CH-~~, and ~~-C=C-C=C-~~ -CH=CH-CH=CH-; and

~~W¹, W², and W³, independently, represent one or more optional substituents on core rings which can be selected from the group consisting of H, halogen, alkyl, haloalkyl, alkenyl, haloalkenyl, nitro and nitrile; and~~

~~rings T, A and B~~ R^T, R^A, and R^B together representing the ~~represent a mesogenic core, wherein each of R^T, R^A, and R^B is independently are selected from the group consisting of cycloalkylene, heterocycloalkylene, cycloalkenylene, heterocycloalkenylene, arylene, and heteroarylene each of which is independently optionally substituted with one or more substituents selected from the group consisting of halide, alkyl, haloalkyl, alkenyl, haloalkenyl, nitro, and nitrile cyclohexane, cyclohexene, a phenyl and a naphthyl group wherein one or two ring CH₂ groups or CH groups are replaced by -N-, NH-, O- or -CO-~~

2. (Currently Amended) The composition of claim 1 wherein ~~CR~~ is selected from the group consisting of:

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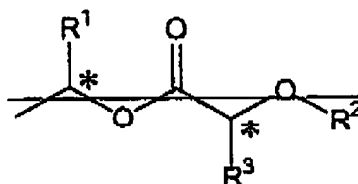
wherein * indicates an asymmetric carbon; R^1 and R^2 , independently of each other, are hydrogen, lower alkyl or alkenyl groups optionally substituted with one or more halogens, and R^3 is an alkyl, alkenyl, ether, thioether, or silyl group having from 1 to about 20 carbon atoms wherein one or more CH_2 groups are replaced with $-S-$, $-O-$, $-CO-$, $-COO-$, $-OCO-$, or $-Si(R^4)-$, and where R^4 is a lower alkyl optionally substituted with one or more halogens each of R^1 , R^2 , and R^3 is independently selected from the group consisting of naphthylene, cyclohexylene, 6-membered heterocycloalkylene comprising one or two ring nitrogen atoms, cyclohexenylene, 6-membered heterocycloalkenylene comprising one or two ring nitrogen atoms, phenylene, and heteroarylene comprising one or two ring nitrogen atoms each of which is independently optionally substituted with one or more substituents

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selected from the group consisting of halide, alkyl, haloalkyl, alkenyl, haloalkenyl, nitro, and nitrile.

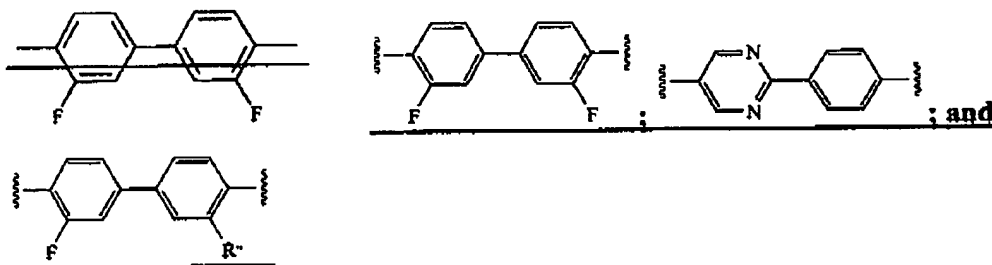
3. (Currently Amended) The composition of claim 1 wherein each of R^T , R^A , and R^B is independently selected from the group consisting of naphthylene, phenylene, cyclohexylene, cyclohexenylene, pyrimidinylene, pyridinylene, 1,2,3,4-tetrahydronaphthylene, and 1,4-dihydronaphthylene. CR is:



4-9. (Cancelled).

10. (Currently Amended) The composition of claim 1, wherein ~~the chiral nonracemic compound has a biphenyl~~ said mesogenic core is a biaryl moiety.

11. (Currently Amended) The composition of claim 1 wherein ~~the chiral nonracemic compound has the~~ said mesogenic core selected from the group consisting of:

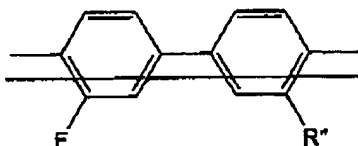


where R'' is lower alkyl.

12. (Cancelled).

13. (Currently Amended) The composition of Claim 1, wherein said chiral, non-racemic liquid crystal composition further comprises an achiral liquid crystal host the ~~chiral nonracemic compound has the mesogenic core:~~

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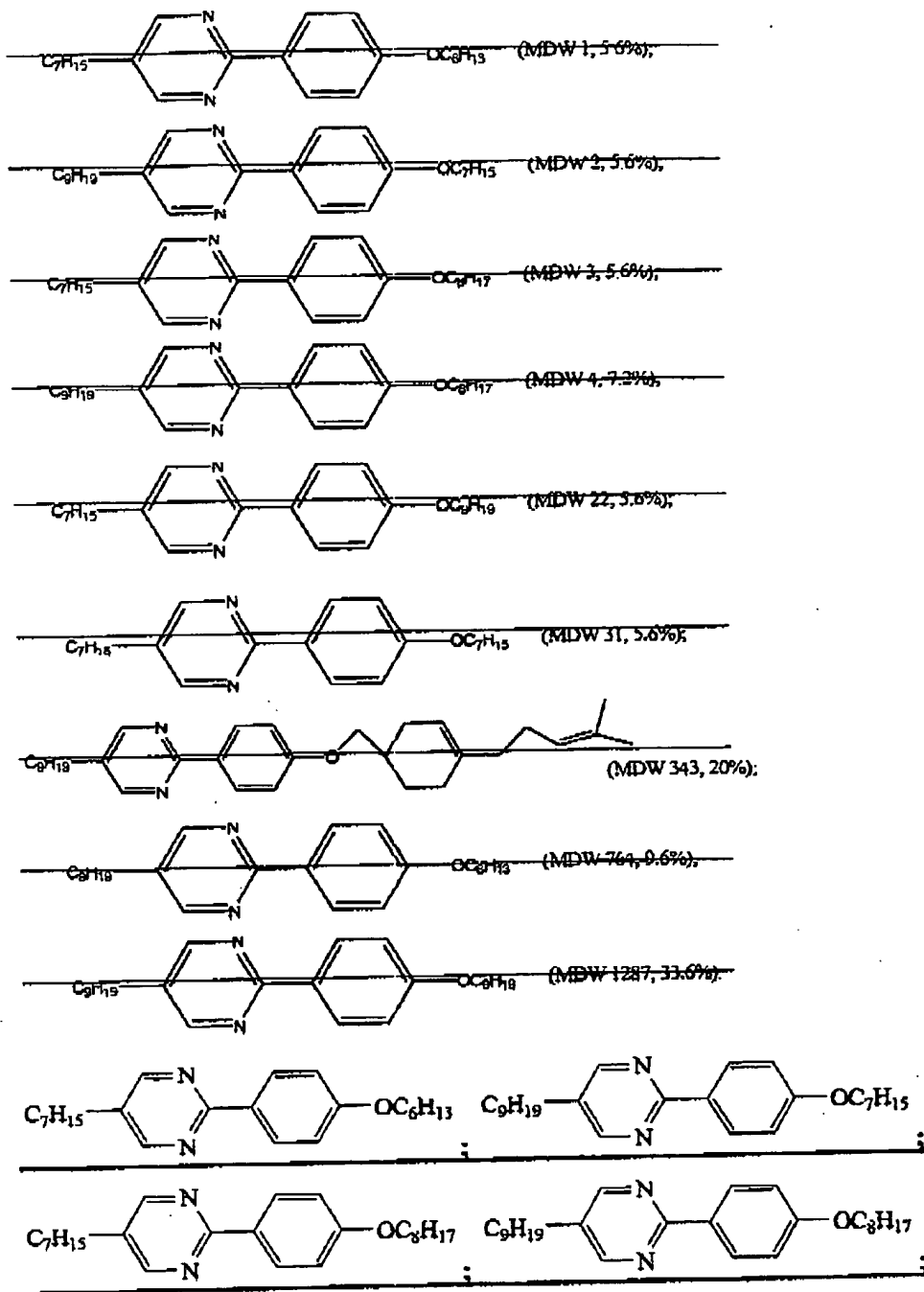


~~where R' is a lower alkyl group.~~

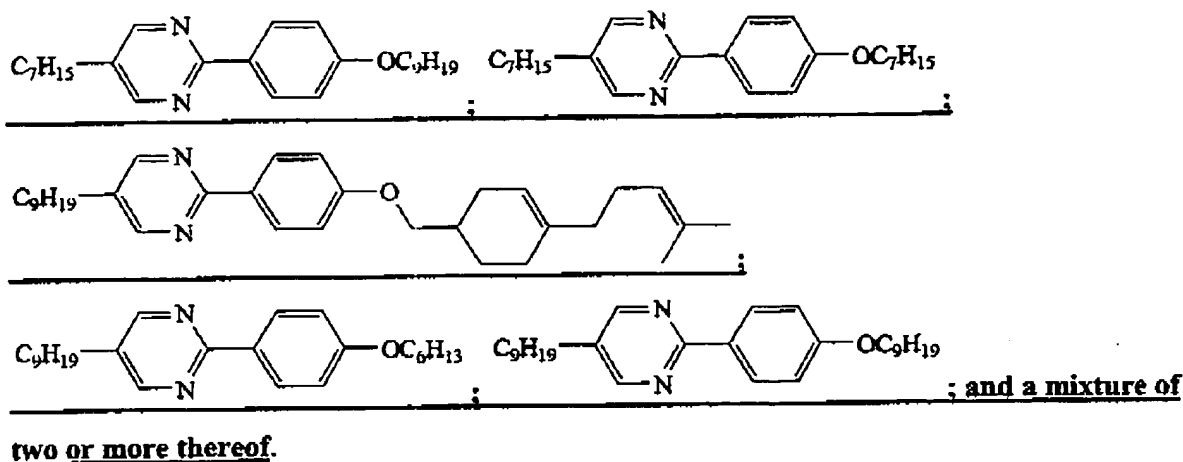
14. (Cancelled).

15. (Currently Amended) The composition of claim ~~4~~ 13, wherein ~~the~~ said achiral liquid crystal host is comprises an achiral compound selected from the group consisting of:

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16-19. (Cancelled).

20. (Currently Amended) The composition of claim 1 wherein ~~in the chiral nonracemic compound~~ $n = m$.

21. (Currently Amended) The composition of claim 1 wherein ~~in the chiral nonracemic compound~~ Y is O.

22. (Currently Amended) The composition of claim 1 wherein the ~~chiral nonracemic compounds are present in the composition at a level of~~ total amount of chiral compound in said chiral, non-racemic liquid crystal composition is 10% or less.

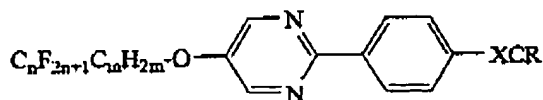
23. (previously presented) The composition of claim 1 which has Ps of 10 nC/cm² or more at room temperature.

24. (Currently Amended) The composition of claim 23 wherein the ~~chiral nonracemic compounds are present at a level of~~ total amount of chiral compound in said chiral, non-racemic liquid crystal composition is 5% by weight or less.

25-39. (Cancelled).

40. (Currently Amended) A ~~chiral nonracemic~~ compound having the formula:

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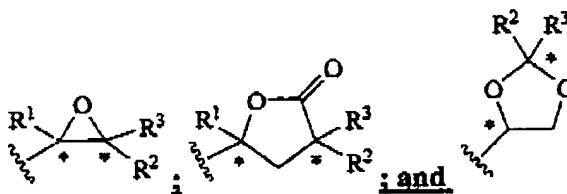
where wherein

n and m are integers ranging from 1 to about 20;

X is selected from the group consisting of a single bond, oxygen, -CO-, -OCO-, -CO-O-,

and a lower alkyl group, **wherein where** one or more carbon atoms **of said lower alkyl group** is optionally **substituted with one or more of replaced with** oxygen or -CO-; and

CR is selected from the group consisting of:



wherein

~~* indicates an asymmetric carbon;~~

R¹ and R³, independently of each other, are hydrogen, lower alkyl, **or lower alkenyl, groups optionally substituted with one or more halogens, lower haloalkyl, or lower haloalkenyl;** and

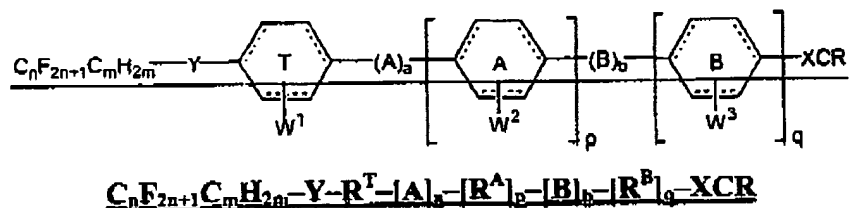
R² is ~~a~~ hydrogen, ~~an~~ alkyl, alkenyl, ether, thioether, or silyl group having from 1 to about 20 carbon atoms wherein one or more CH₂ groups are **optionally** replaced with -S-, -O-, -CO-, -CO-O-, -O-CO-, or ~~-Si(R')~~₂ ~~-Si(R')~~₂, and **where wherein** R' is a lower alkyl optionally substituted with one or more halogens;

provided at least one carbon center indicated by * is an asymmetric carbon center.

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41. (Currently Amended) A chiral, non-racemic liquid crystal composition ~~which comprises one or more~~ comprising a chiral, non-racemic compounds having compound of the formula:



wherein

n is an integer from 1 to 20; and

m is an integer from 2 to 20;

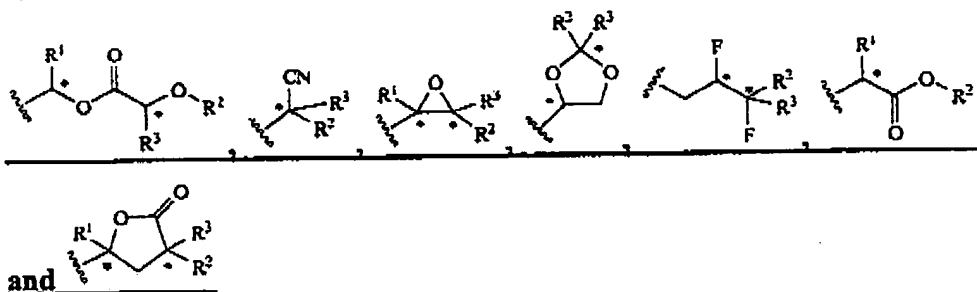
a , b , p and q are either 0 or 1, when p is 0, a is 0 and when q is 0, b is 0;

Y is a single bond or an oxygen;

X is selected from the group consisting of a single bond, oxygen, $-\text{CO}-$, $-\text{O}-\text{CO}-$, $-\text{CO}-\text{O}-$ and a lower alkyl group where one or more carbon atoms is optionally substituted with one or more of oxygen or $-\text{CO}-$;

CR is ~~a chiral, non-racemic tail group except that CR cannot be a chiral hydrocarbon tail;~~

selected from the group consisting of:



and

wherein

each of R^1 and R^3 is independently hydrogen, lower alkyl, lower alkenyl, lower haloalkyl, or lower haloalkenyl;

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R² is an alkyl, alkenyl, ether, thioether, or silyl group having from 1 to about 20 carbon atoms wherein one or more CH₂ groups are optionally replaced with -S-, -O-, -CO-, -CO-O-, -O-CO-, or -Si(R')₂, and where R' is lower alkyl or lower haloalkyl, provided at least one carbon center indicated by * is an asymmetric carbon center;

A and B, independently, are linker groups ~~that can be~~ selected from the group consisting of -CO-, -O-CO-, -CO-O-, -CH₂-CH₂-, -CH₂-CH₂-O-, -O-CH₂-CH₂-, -C≡C-, ~~-C=C-~~ -CH=CH-, and ~~-C≡C-C≡C-~~ -CH=CH-CH=CH-; and

~~W¹, W², and W³, independently, represent one or more optional substituents on core rings which can be selected from the group consisting of H, halogen, alkyl, haloalkyl, alkenyl, haloalkenyl, nitro and nitrile; and~~

~~rings T, A and B together representing the mesogenic core are selected from the group cyclohexane, cyclohexene, a phenyl and a naphthyl group wherein one or two ring CH₂ groups or CH groups are replaced by N, NH, O or CO.~~
R^T, R^A, and R^B together represent a mesogenic core, wherein each of R^T, R^A, and R^B is independently selected from the group consisting of:

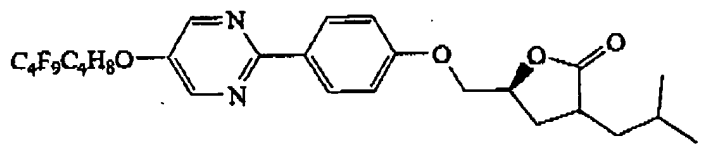
- (a) cyclohexylene,
- (b) 6-membered heterocycloalkylene comprising one or two heteroatoms each of which is independently selected from the group consisting of nitrogen and oxygen,
- (c) cycloalkenylene,
- (d) 6-membered heterocycloalkenylene comprising one or two heteroatoms each of which is independently selected from the group consisting of nitrogen and oxygen,
- (e) phenylene,
- (f) naphthylene, and

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(g) heteroaryl comprising one or two heteroatoms each of which is independently selected from the group consisting of nitrogen and oxygen,
wherein each of R^T , R^A , and R^B is independently optionally substituted with one or more substituents selected from the group consisting of halide, alkyl, haloalkyl, alkenyl, haloalkenyl, nitro, and nitrile.

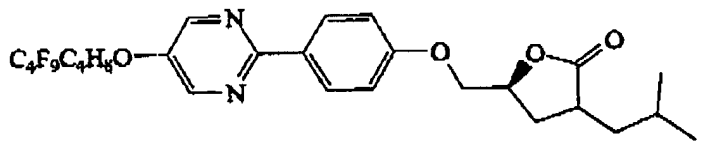
42. (Currently Amended) A chiral, non-racemic liquid crystal composition which comprises one or more chiral, ~~non-racemic~~ compounds of claim 40.

43. (Currently Amended) ~~The chiral, non-racemic A~~ compound of the formula:



44-45. (Cancelled).

46. (Currently Amended) The chiral, non-racemic liquid crystal composition of claim ~~45~~ 41, which comprises a ~~wherein the~~ chiral, ~~non-racemic~~ compound ~~having is of~~ the formula:

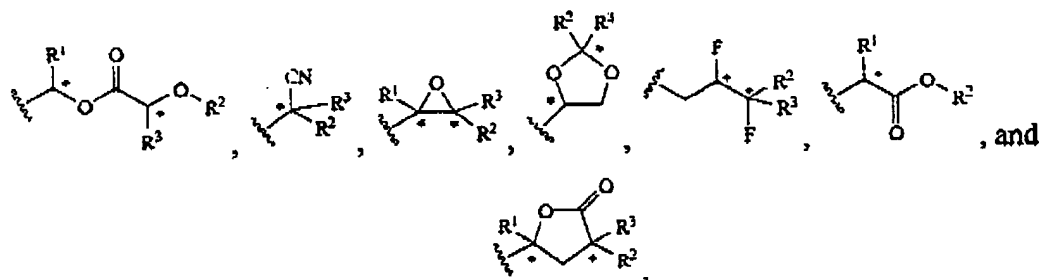


47. (New) A non-racemic liquid crystal composition comprising a rod-like chiral liquid crystal compound and optionally an achiral liquid crystal host, wherein said rod-like chiral liquid crystal compound comprises a mesogenic core moiety having an achiral fluorinated alkyl tail on one end of the long axis of said mesogenic core moiety and a chiral tail on the other end of the long axis of said mesogenic core moiety, wherein:

said mesogenic core comprises a cyclic ring system, wherein said cyclic ring system is selected from the group consisting of cycloalkylene, cycloalkenylene,

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heterocycloalkylene, heterocycloalkenylene, arylene, heteroarylene, and a combination of two or more thereof; and
said chiral tail comprises a chiral moiety selected from the group consisting of:



wherein

each of R¹ and R³ is independently hydrogen, lower alkyl, lower alkenyl, lower haloalkyl, or lower haloalkenyl; and

R^2 is an alkyl, alkenyl, ether, thioether, or silyl group having from 1 to about 20 carbon atoms wherein one or more CH_2 groups are optionally replaced with -S-, -O-, -CO-, -CO-O-, -O-CO-, or -Si(R')₂, and where R' is lower alkyl or lower haloalkyl;

provided at least one carbon center indicated by * is an asymmetric carbon center.

48. (New) The non-racemic liquid crystal composition of Claim 47, wherein said mesogenic core moiety comprises three cyclic ring systems or less.

49. (New) The non-racemic liquid crystal composition of Claim 48, wherein each of said cyclic ring system is selected from the group consisting of cyclohexylene, cyclohexenylene, heterocycloalkylene comprising one or two ring nitrogen atoms, heterocycloalkenylene comprising one or two ring nitrogen atoms, phenylene, naphthylene, and heteroarylene comprising one or two ring nitrogen atoms.

50. (New) The non-racemic liquid crystal composition of Claim 47, wherein each of said cyclic ring system is independently a six-membered monocyclic ring system or a ten-membered bicyclic ring system.

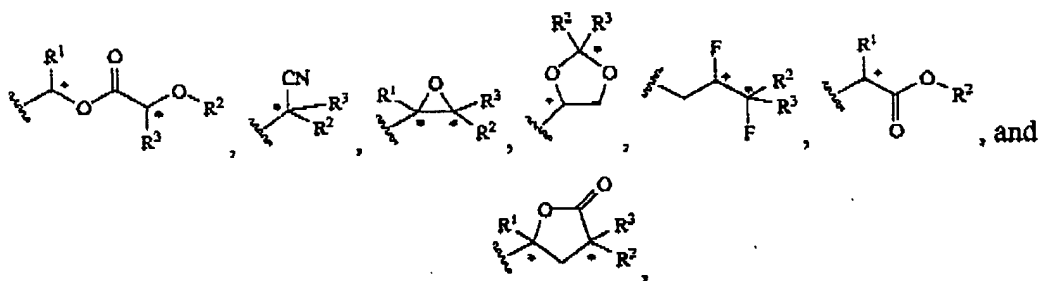
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51. (New) A rod-like liquid crystal compound comprising a mesogenic core moiety, wherein said mesogenic core moiety is substituted with an achiral fluorinated alkyl substituent on one end of the long axis of said mesogenic core moiety and a chiral substituent on the other end of the long axis of said mesogenic core moiety, wherein:

said mesogenic core comprises a cyclic ring system, wherein said cyclic ring system is selected from the group consisting of cycloalkylene, cycloalkenylene, heterocycloalkylene, heterocycloalkenylene, arylene, heteroarylene, and a combination of two or more thereof; and

said chiral substituent comprises a chiral moiety selected from the group consisting of:



wherein

each of R^1 and R^3 is independently hydrogen, lower alkyl, lower alkenyl, lower haloalkyl, or lower haloalkenyl; and

R^2 is an alkyl, alkenyl, ether, thioether, or silyl group having from 1 to about 20 carbon atoms wherein one or more CH_2 groups are optionally replaced with -S-, -O-, -CO-, -CO-O-, -O-CO-, or -Si(R')₂, and where R' is lower alkyl or lower haloalkyl;

provided at least one carbon center indicated by * is an asymmetric carbon center.